CLAIMS

1. A method for applying a barrier to a structure to prevent the infiltration of pest species, comprising the steps of:

   (a) providing a coating composition, which comprises:

      (i) a transport polyurethane polymer system; and

      (ii) a pellet comprising a pest control agent incorporated into a pellet polymer and dispersed in said transport polyurethane polymer system; and

   (b) associating said coating composition with said structure.

2. The method of claim 1, wherein said pellet polymer is one or more of polyethylene, polypropylene, polybutenes, natural rubber, polyisoprene, polyesters, styrene butadiene rubber, polyacrylates, polymethacrylates, polyethylene terephthalate, epoxy resins, unsaturated polyester resins, or polyurethane elastomer.

3. The method of claim 1, wherein said pesticide is incorporated by an inorganic sorbent and then dispersed in said pellet polymer.

4. The method of claim 3, wherein said inorganic sorbent is one or more of silica; carbon; aerogels; oxides of metals; and oxides, carbonates or phosphates of Group 2 metals.

5. The method of claim 1, wherein said pellets are coated with a barrier material.

6. The method of claim 5, wherein said barrier materials are one or more of polyvinylidene chloride, amorphous nylon, ethylene-vinyl alcohol, epoxy resins, and unsaturated polyesters.

7. The method of claim 1, wherein said pellets range in particle size from about 100 microns to 12,700 microns.

8. The method of claim 1, wherein said coating composition also contains one or more of powdered pepper, a pepper extract, an antimicrobial agent, pigments, ultraviolet radiation absorbers, molecular sieves, or silica gel.

9. The method of claim 1, wherein said polyurethane polymer system is formed from a non-aromatic diisocyanate.

10. The method of claim 9, wherein said polyurethane polymer system is formed from said non-aromatic diisocyanate and a diol chain extender of up to 12 carbon atoms.

11. The method of claim 1, wherein said polyurethane polymer system is enriched in urea linkages.

12. The method of claim 11, wherein said urea linkage are formed from the reaction of a non-aromatic polyisocyanate with the reaction product of a diisocyanate and a diamine.

13. The method of claim 12, wherein said diisocyanate is one or more of toluene diisocyanate (TDI), methylene diisocyanate (MDI), polymeric methylene diisocyanate (PMDI), hexamethylene diisocyanate (HDI), isophorone diisocyanate (IPDI) and said diamine is one or more of 4,4'-methylene dianiline, 1,4-diaminocyclohexane, 2,4-diaminotoluene, or 2,6-diaminotoluene, 1,4-diaminohexane.

14. The method of claim 12, wherein an excess of polyisocyanate is used to form said reaction product.

15. The method of claim 1, wherein polyurethane polymer system is formed from an aliphatic or alicyclic isocyanate.

16. The method of claim 15, wherein said aliphatic or alicyclic isocyanate is one or more of 1,6-hexamethylene diisocyanate (HDI), 1,4-tetramethylene diisocyanate, hydrogenated methylene diphenyl diisocyanate, 1,4-cyclohexane diisocyanate, or isophorone diisocyanate.

17. The method of claim 15, wherein polyurethane polymer system also is formed from a polyol having a molecular weight of less than about 1,000.

18. The method of claim 15, wherein said polyurethane polymer system contains hard segments made by one or more of the use of polyisocyanates having greater than 2 isocyanate groups per molecule; use of polyol having a molecular weight of less than about 1,000 and greater than 2 hydroxyl groups per molecule; an excess of isocyanate is used; or reaction of said isocyanate with an amine.

19. The method of claim 18, wherein said isocyanate is polymeric methylene diisocyanate, and said polyol is one or more of trimethylolpropane, glycerin, Sorbitol, glycerin, polyether triols, trimethylol propane polyether triols, or hydrogenated castor oil.

20. The method of claim 1, wherein polyurethane polymer system is formed from an aliphatic or alicyclic polyol.

21. The method of claim 20, wherein said aliphatic or alicyclic polyol is one or more of hydroxy terminated polybutadiene, straight chain hydrocarbons that have 8 to 30 carbons with hydroxyl groups at each end, carbocyclic rings that contain from 5 to 32 members with hydroxyl groups that are not on adjacent carbons, or carbocyclic rings that contain from 5 to 32 members that have one or more rings and that have two straight chain hydrocarbon chains that are substituents with two hydroxyl groups present, one at the end of each pendent chain.

22. The method of claim 15, wherein polyurethane polymer system is formed from an aliphatic or alicyclic polyol.

23. The method of claim 1, wherein said applying is one or more of spraying, roller coating, or brush coating.

24. The method of claim 1, wherein the wherein the pesticide is one or more of pyrethrin, tefluthrin, lambdacyhalothrin, cyfluthrin, deltamethrin, isofenphos, fenvalerate, cypermethrin, or permethrin.

25. The method of claim 1, wherein said structure is composed of one or more of wood, wood-containing material, wood-derived material, metal, masonry, cementitous material, metal, ceramic, or fiberglass.

26. The method of claim 1, wherein said coating composition is applied to a pathway leading to said structure.

27. The method of claim 26, wherein said pathway includes one or more of concrete, masonry, or soil.

28. The method of claim 1, wherein said pest species is one or more of microbes, fungi, algae, bacteria, viruses, spores, insects, birds, land animals, mollusks, or rodents.

29. The method of claim 28, wherein said pest species is one or more of termites, ants, boring wasps, deer, squirrels, mice, rats, clams, oysters, or mussels.

30. The method of claim 25, wherein said wood structure is one or more of plywood, particleboard, oriented strand board (OSB), medium density fiberboard (MDF), laminated veneer lumber (LVL), laminated beams, paperboard, or kraft paper.

31. The method of claim 1, wherein said transport polyurethane polymer system is one or more of a coating composition, a sealant, a caulk, or an adhesive.

32. The method of claim 1, wherein said associating comprises admixing said composition with soil adjacent to said structure.

33. The method of claim 32, wherein said composition is mixed with one or more of vermiculite or perlite for admixing with said soil.

34. A coating composition for applying a barrier to a structure to prevent the infiltration of pest species, comprising:

(a) a transport polyurethane polymer system; and

(b) a pellet comprising a pesticide incorporated into a pellet polymer and dispersed in said transport polyurethane polymer system;

35. The coating composition of claim 34, wherein said pellet polymer is one or more of polyethylene, polypropylene, polybutenes, natural rubber, polyisoprene, polyesters, styrene butadiene rubber, polyacrylates, polymethacrylates, polyethylene terephthalate, epoxy resins, unsaturated polyester resins, or polyurethane elastomer.

36. The coating composition of claim 34, wherein said pesticide is incorporated by an inorganic sorbent and then dispersed in said pellet polymer.

37. The coating composition of claim 36, wherein said inorganic sorbent is one or more of silica; carbon; aerogels; oxides of metals; and oxides, carbonates or phosphates of Group 2 metals.

38. The coating composition of claim 35, wherein said pellets are coated with a barrier material.

39. The coating composition of claim 36, wherein said barrier materials are one or more of polyvinylidene chloride, amorphous nylon, ethylene-vinyl alcohol, epoxy resins, and unsaturated polyesters.

40. The coating composition of claim 34, wherein said pellets range in particle size from about 100 microns to 12,700 microns.

41. The coating composition of claim 34, wherein said coating composition also contains one or more of powdered pepper, a pepper extract, an antimicrobial agent, pigments, ultraviolet radiation absorbers, molecular sieves, or silica gel.

42. The coating composition of claim 34, wherein said polyurethane polymer system is formed from a non-aromatic diisocyanate.

43. The coating composition of claim 42, wherein said polyurethane polymer system is formed from said non-aromatic diisocyanate and a diol chain extender of up to 12 carbon atoms.

44. The coating composition of claim 34, wherein said polyurethane polymer system is enriched in urea linkages.

45. The coating composition of claim 44, wherein said urea linkage are formed from the reaction of a non-aromatic polyisocyanate with the reaction product of a diisocyanate and a diamine.

46. The coating composition of claim 43, wherein said diisocyanate is one or more of toluene diisocyanate (TDI), methylene diisocyanate (MDI), polymeric methylene diisocyanate (PMDI), hexamethylene diisocyanate (HDI), isophorone diisocyanate (IPDI) and said diamine is one or more of 4,4'-methylene dianiline, 1,4-diaminocyclohexane, 2,4-diaminotoluene, 2,6-diaminotoluene, or 1,6-diaminohexane.

47. The coating composition of claim 43, wherein an excess of polyisocyanate is used to form said reaction product.

48. The coating composition of claim 35, wherein polyurethane polymer system is formed from an aliphatic or alicyclic isocyanate.

49. The coating composition of claim 48, wherein said aliphatic or alicyclic isocyanate is one or more of 1,6-hexamethylene diisocyanate (HDI), 1,4-tetramethylene diisocyanate, hydrogenated methylene diphenyl diisocyanate, 1,4-cyclohexane diisocyanate, or isophorone diisocyanate.

50. The coating composition of claim 48, wherein polyurethane polymer system also is formed from a polyol having a molecular weight of less than about 1,000.

51. The coating composition of claim 48, wherein said polyurethane polymer system contains hard segments made by one or more of;
the use of polyisocyanates having greater than 2 isocyanate groups per molecule;
use of polyol having a molecular weight of less than about 1,000 and greater than 2 hydroxyl groups per molecule;
an excess of isocyanate is used;
or reaction of said isocyanate with an amine.

52. The coating composition of claim 51, wherein said isocyanate is polymeric methylene diisocyanate, and said polyol is one or more of trimethylolpropane, glycerin, Sorbitol, glycerin, polyether triols, trimethylol propane polyether triols, or hydrogenated castor oil.

53. The coating composition of claim 34, wherein polyurethane polymer system is formed from an aliphatic or alicyclic polyol.

54. The coating composition of claim 53, wherein said aliphatic or alicyclic polyol is one or more of hydroxy terminated polybutadiene, straight chain hydrocarbons that have 8 to 30 carbons with hydroxyl groups at each end, carbocyclic rings that contain from 5 to 32 members with hydroxyl groups that are not on adjacent carbons, or carbocyclic rings that contain from 5 to 32 members that have one or more rings and that have two straight chain hydrocarbon chains that are substituents with two hydroxyl groups present, one at the end of each pendent chain.

55. The coating composition of claim 48, wherein polyurethane polymer system is formed from an aliphatic or alicyclic polyol.

56. The coating composition of claim 34, which is applicable to said structure by one or more of spraying, roller coating, or brush coating.

57. The coating composition of claim 34, wherein the wherein the pesticide is one or more of pyrethrin, tefluthrin, lambdacyhalothrin, cyfluthrin, deltamethrin, isofenphos, fenvalerate, cypermethrin, or permethrin.

58. The coating composition of claim 34, wherein said transport polyurethane polymer system is one or more of a coating composition, a sealant, a caulk, or an adhesive.

59. The coating composition of claim 34, wherein said transport polyurethane polymer system is synthesized from isocyanates with functionality greater than 2.

60. The coating composition of claim 34, wherein said transport polyurethane polymer system is synthesized from low molecular weight polyols with functionality greater than 2.

61. The coating composition of claim 60, wherein said transport polyurethane polymer system is synthesized from polyols, which are one or more of trimethylolpropane, glycerin, sorbitol. glycerin polyether triols, and trimethylol propane polyether triols.

62. The coating composition of claim 48, wherein polyurethane polymer system is formed from an epoxy or silanol polyol that produces block copolymers.